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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,734	04/14/2004	Yukihiro Satou	HITA.0542	4886

7590 08/11/2005

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EXAMINER

ANDUJAR, LEONARDO

ART UNIT PAPER NUMBER

2826

DATE MAILED: 08/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/823,734	Applicant(s) SATO ET AL.	
	Examiner Leonardo Andújar	Art Unit 2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07/13/2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>04/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Acknowledgment

1. The preliminary amendment filed on 04/14/2005 has been entered. The present Office action is made with all the suggested amendments being fully considered. Accordingly, pending in this Office action are claims 1-16.

Drawings

2. Figures 23-26 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

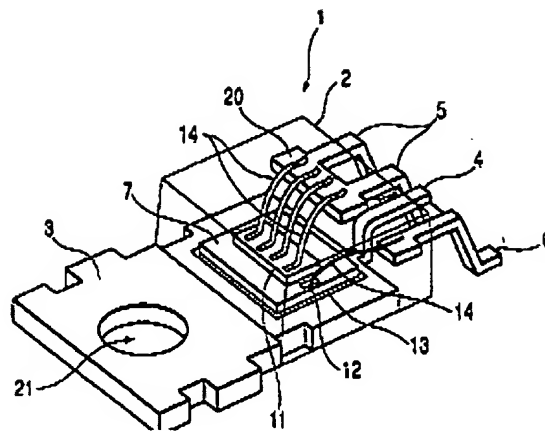
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-10 and 14-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Takahashi et al. (US 6,307,272).

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5. Regarding claim 1, Takahashi (e.g. fig. 1) shows a semiconductor device comprising: a sealing body 1 comprised of insulating region; a metal-made support board 3 which has at least a portion thereof covered with the sealing body and has a lower surface thereof exposed from the sealing body and constituting a first electrode a first electrode lead 4 contiguous to the support board and projects from a one-side surface of the sealing body; a second electrode lead 5 and a control electrode lead 6 which project from the one-side surface of the sealing body and extend parallel to the first electrode lead; a semiconductor chip 7 which is covered with the sealing body, has a first electrode (drain) on a lower surface thereof, has a second electrode pad 11 and a control electrode pad 12 on an upper surface thereof, and has a lower surface thereof fixed to the support board by a conductive bonding material 13; connecting means 14 which is positioned in the inside of the sealing body and electrically connects the second electrode pad with the second electrode lead; and connecting means 14 which is positioned in the inside of the sealing body and electrically connects the control electrode pad with the control electrode lead, wherein the control electrode pad is arranged at a position from the control electrode lead and the second electrode lead farther than the second electrode pad (col. 13/lis. 56-67 & col. 14/lis. 1-15).

FIG. 1



6. Regarding claim 2, Takahashi (e.g. fig. 1) shows the semiconductor chip has a quadrangular shape, one side of the semiconductor chip opposing faces lead posts formed to distal ends of the control electrode lead and the second electrode lead, and the control electrode pad is positioned at one corner portion of the semiconductor chip which is formed contiguously to a side of the semiconductor chip which is opposite to the opposing facing side. In this case, the term portion is interpreted as the area around the lower left corner that includes the pad 12.

7. Regarding claim 3, Takahashi (e.g. fig. 1) shows that the semiconductor chip has a quadrangular shape, one side of the semiconductor chip opposing faces lead posts formed to distal ends of the control electrode lead and the second electrode lead, and the control electrode pad is positioned at a midst portion of a side which is formed contiguously to the opposing facing side and is orthogonal to the opposing facing side.

8. Regarding claim 4, Takahashi (e.g. fig. 1) shows that the connecting means is formed of a conductive wire, the second electrode pad and the second electrode lead

are connected with each other through a plurality of wires, and the wires are thicker than a wire which connects the control electrode pad and the control electrode lead.

9. Regarding claim 5, Takahashi (e.g. fig. 1) shows that a width of the second electrode lead is set wider than a width of other leads.

10. Regarding claim 6, Takahashi (e.g. fig. 1) shows that the first electrode lead is positioned at the center, the control electrode lead is positioned at one side of the first electrode lead, and the second electrode lead is positioned at another side of the first electrode lead.

11. Regarding claim 7, Takahashi (e.g. fig. 64) shows that the second electrode lead is positioned at the center, the control electrode lead is positioned at one side of the second electrode lead, and the first electrode lead is positioned at another side of the second electrode lead.

12. Regarding claim 8, Takahashi (e.g. fig. 1) shows a plurality of second electrode pads are provided and the respective second electrode pads and the second electrode lead are electrically connected with each other by the connecting means.

13. Regarding claim 9, Takahashi shows that the plurality of second electrode pads are formed along the extending direction of the respective leads and the connecting means which is connected to the second electrode leads adopts the stitch bonding constitution in which the connecting means is connected with the plurality of second electrode pads respectively.

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14. Regarding claim 10, Takahashi (e.g. fig. 1) shows that the plurality of second electrode pads are formed in a staggered pattern along the direction (vertical) which intersects the extending direction of the respective leads (horizontal).

15. Regarding claim 14, Takahashi (e.g. fig. 1) shows that the with respect to the leads which project from the sealing body, the second electrode lead and the control electrode lead have the surface mounting structure in which the second electrode lead and the control electrode lead have midst portions thereof bent and distal ends thereof extended while being positioned at a height equal to a height of the support board, and wherein the first electrode lead which is formed contiguously with the support board is formed of a lead which is cut in the vicinity of the sealing body and is not used.

16. Regarding claim 15, Takahashi teaches that the semiconductor chip includes a power MOSFET (abstract).

17. Regarding claim 16, Takahashi teaches that the a field effect transistor is incorporated into the semiconductor chip (e.g. fig. 4), the first electrode lead constitutes a drain lead, the control electrode lead constitutes a gate lead, and the second electrode lead constitutes a source lead (col. 14/lls. 1-7).

Claim Rejections - 35 USC § 103

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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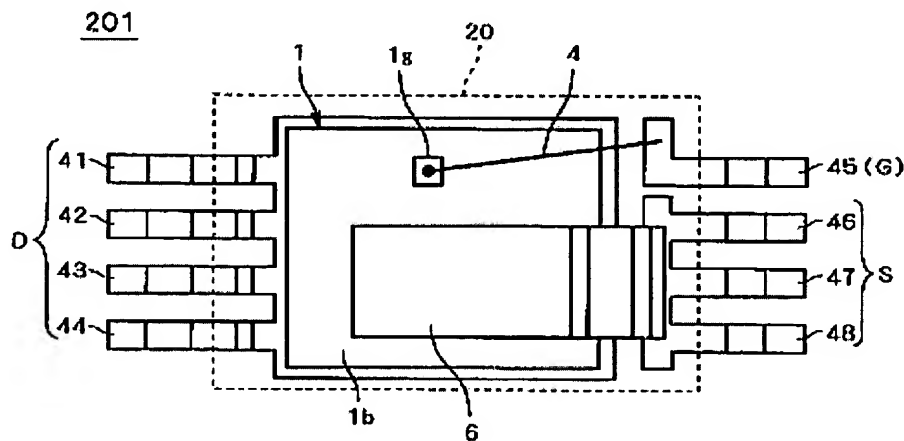
19. Initially, and with respect to claims, note that a "product by process" claim is directed to the product per se, no matter how actually made. See In re Thorpe et al., 227 USPQ 964 (CAFC, 1985) and the related case law cited therein which makes it clear that it is the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that, as here, an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. As stated in Thorpe, even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. In re Brown, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972); In re Pilkington, 411 F.2d 1345, 1348, 162 USPQ 145, 147 (CCPA 1969); Buono v. Yankee Maid Dress Corp., 77 F.2d 274, 279, 26 USPQ 57, 61 (2d. Cir. 1935). Note that Applicant has burden of proof in such cases as the above case law makes clear.

20. Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al. (US 6,307,272) in view of Hamachi (US 20030062608).

21. Regarding claim 11, Takahashi (e.g. fig. 1) shows most aspects of the instant invention including the connecting means which connects the second electrode pad with the second electrode lead, and the connecting means which connects the control electrode pad with the control electrode lead is formed of a wire. Takahashi does not disclose that the connecting means, which connects the second electrode pad with the second electrode lead, is formed of a conductive plate. Nevertheless, Hamachi shows connecting means 6 which connects second electrode pads (source pads) of the

integrated circuit 1 with a second electrode lead 46/48 which is formed of a conductive plate. According to Hamachi, this type of embodiment reduces the sheet resistance in the surface of the semiconductor chip and kept low the current density in the drain electrode (pp 0041).

F I G . 5



It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a conductive plate to connect the second electrode pad and second electrode lead disclosed by Takashi in order to reduce the sheet resistance in the surface of the semiconductor chip and kept low the current density in the drain electrode as taught by Hamachi.

22. Regarding claims 12 and 13, Takahashi in view of Hamachi shows most aspects of the instant invention including a second electrode pad and the second electrode lead connected by an adhesive material (e.g. the encapsulant 20) but does not disclose that the conductive plate is formed from a resilient ribbon strap and was connected by ultrasonic wave bonding or formed of a metal plate molded in a predetermined shape. Nevertheless, the method for forming the conductive plate such formed from a resilient

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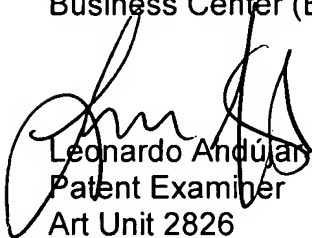
ribbon strap or molding and the method to make the connection such as ultrasonic wave bonding are intermediate process steps that do not affect the structure of the final device.

Conclusion

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonardo Andújar whose telephone number is 571-272-1912. The examiner can normally be reached on Mon through Thu from 9:00 AM to 7:30 PM EST.

24. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J. Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

25. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Leonardo Andújar
Patent Examiner
Art Unit 2826
08/06/2005